data points **220** reflect the statistical uncertainties of the measurements, the uncertainty in the calibration of the photomultiplier tube detector, but not the uncertainty in the collection efficiency of detector which is estimated to be of order 20%.

It will be appreciated that variations of the above-disclosed and other features and functions, or alternatives thereof, may be desirably combined into many other different systems or applications. Also that various presently unforeseen or unanticipated alternatives, modifications, variations or improvements therein may be subsequently made by those skilled in the art which are also intended to be encompassed by the following claims.

The embodiments of the invention in which an exclusive property or right is claimed are defined as follows. Having thus described the invention, what is claimed is:

1. An apparatus for detecting slow neutrons, said apparatus comprising:

at least one cell among a plurality of cells, said at least one cell containing a substance exposed to the slow neutrons wherein the slow neutrons cause the substance to emit ultraviolet radiation, comprising Lyman alpha radiation at a wavelength of approximately 122 nanometers, that is emitted from the at least one cell;

at least one detector device monitoring the ultraviolet radiation and producing a detection of ultraviolet radiation; and

an interface associated with said at least one cell and said at least one detector, wherein said interface converts the detection of ultraviolet radiation into a measure of slow neutron fluence.

2. The apparatus of claim **1** wherein said substance comprises ^{3}He gas.

3. The apparatus of claim **1** wherein said substance comprises liquid ^{3}He.

4. The apparatus of claim **1** wherein said substance contains a mixture of ^{3}He and another gas.

5. The apparatus of claim **1** wherein said substance contains a mixture of ^{3}He and another liquid.

6. An apparatus for detecting slow neutrons, said apparatus comprising:

at least one cell among a plurality of cells, said at least one cell containing ^{3}He gas exposed to a source of neutrons;

at least one detector device for monitoring far ultraviolet radiation, comprising Lyman alpha radiation at a wavelength of approximately 122 nanometers, emitted from said at least one cell, wherein a detection of far ultraviolet radiation by said at least one detector is indicative of a presence of slow neutrons; and

an interface associated with said at least one cell and said at least one detector, wherein said interface converts a said detection of far ultraviolet radiation into a measure of slow neutron fluence.

7. A method for detecting slow neutrons, said method comprising:

reacting the slow neutrons with ^{3}He to produce Lyman alpha radiation; and

monitoring the Lyman alpha radiation in a far ultraviolet region of an electromagnetic spectrum, wherein a detection of Lyman alpha radiation at a wavelength of approximately 122 nanometers is indicative of a presence of slow neutrons.

8. The method of claim **7** wherein said slow neutrons produce said Lyman alpha radiation by a direct excitation of a 2p state of at least one of hydrogen and tritium in a course of a nuclear reaction with ^{3}He.

9. The method of claim **7** wherein said neutrons produce said Lyman alpha radiation by an electron capture to a 2p state of at least one of hydrogen and tritium, as a result of an electron transfer collisions of tritons and protons with ^{3}He.

10. The method of claim **7** wherein said slow neutrons produce said Lyman alpha radiation by an excitation via collisions of at least one of hydrogen and tritium atoms with ^{3}He.

11. The method of claim **7** wherein said slow neutrons produce said Lyman alpha radiation by a radiative recombination of electrons with at least one of protons and tritons produced in said nuclear reaction and with He^{2+}ions.

12. The method of claim **7** wherein said at least one detector device comprises a far-ultraviolet radiation detector.

13. The method of claim **7** wherein said at least one detector comprises a photo-detector that detects spectrally isolated Lyman alpha radiation that is converted to a visible radiation by absorption via a scintillator material layer.

14. The method of claim **7** wherein said slow neutrons produce said Lyman alpha radiation via a ^{3}He(n,tp) nuclear reaction induced by neutrons incident on at least one cell that contains ^{3}He gas exposed to said slow neutrons.

15. The method of claim **14** wherein said at least one cell contains a mixture of ^{3}He and at least one other collection of atoms in a gas form.

16. The method of claim **14** wherein said at least one cell contains a mixture of ^{3}He and at least one other collection of atoms in a liquid form.

17. The method of claim **14** wherein said at least one cell contains a mixture of ^{3}He and at least one other collection of molecules in a gas form.

18. The method of claim **14** wherein said at least one cell contains a mixture of ^{3}He and at least one other collection of molecules in a liquid form.

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